

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method comprising:
 - determining, by a computing device, a configuration of a system of resources;
 - determining, by the computing device, processing requirements of an application running on the system of resources ~~utilizing an application characterization database;~~
 - analyzing, by the computing device, the ~~determined~~ configuration of the system of resources and the processing requirements in order to attempt to optimize the performance of the application;
 - generating, by the computing device, first one or more optimization action suggestions to potentially improve performance of the application, from based on a result of the analyzing~~analysis;~~ and
 - dynamically causing, by the computing device, ~~carrying out~~applying of the first one or more suggested optimization actions~~suggestions;~~
 - predicting, by the computing device, the performance of the application with carrying out of the first one or more suggested optimization actions;
 - observing, by the computing device, actual performance of the application after carrying out of the first one or more suggested optimization actions;
 - comparing, by the computing device, the observed actual performance of the application to the predicted performance of the application;
 - utilizing, by the computing device, a result of the comparing to further generate second one or more optimization action suggestions to potentially further improve performance of the application.
- wherein the application characterization database includes:
- a static application characterization database storing information regarding fixed characteristics of the application; and
 - a dynamic application characterization database storing information regarding mutable characteristics of the application, wherein the static application characterization database is included with the dynamic application characterization database.

2. (Currently Amended) The method of claim 1, wherein dynamically causing ~~applying~~ carrying out of the one or more suggested optimization actions ~~suggestions~~ includes:

dynamically causing, by the computing device, allocating of additional resources ~~to the execution of~~ and interaction with the application; and

dynamically causing, by the computing device, utilizing of one or more acceleration tools.

3. (Currently Amended) The method of claim 2, wherein dynamically causing utilizing of one or more acceleration tools includes causing utilizing one or more tools selected from a group including:

primitive performance libraries;

managed runtime optimization settings; and

reordering portions of application execution.

4. (Currently Amended) The method of claim 1, wherein the determining a configuration of a system of resources includes utilizing a device database and an environment characterization database.

5. (Currently Amended) The method of claim 4, wherein the device database includes information regarding ~~the~~ one or more types of resources in the system of resources and information regarding ~~the~~ one or more physical capabilities of ~~these~~ one or more resources in the system of resources.

6. (Currently Amended) The method of claim 5, wherein the environment characterization database includes information regarding ~~the~~ configuration, ~~substantially~~ current status, and ~~substantially~~ current capacity of ~~the~~ one or more resources within the system of resources.

7. (Currently Amended) The method of claim 6, ~~wherein further comprising~~ incrementally generate the device database and the environment characterization database is

~~incrementally generated~~ as each of the one or more resources of the system of resources is powered-on.

8. (Currently Amended) The method of claim 4, wherein the device database and the environment characterization database ~~is~~ are dynamically generated utilizing a service including:

- collecting, by the computing device, data from sensors coupled with the resources;
- analyzing, by the computing device, the data collected;
- inferring, by the computing device, an execution context characterization;
- estimating, by the computing device, ~~the~~ capacity of each resource; and
- updating, by the computing device, the device database and the environment characterization database.

9.-10. (Cancelled)

11. (Currently Amended) The method of claim 1, ~~wherein generation of the static application characterization database~~ further comprising generating a static application characterization database by:

- determining, by the computing device at the application's compile time, ~~the~~ one or more data types utilized by the application;
- determining, by the computing device at the application's compile time, ~~the~~ frequency of ~~the~~ usage of the one or more data types;
- determining, by the computing device at the application's compile time, ~~the~~ one or more resources required by the application; and
- updating, by the computing device, the static application characterization database ~~with based on the determined information~~ determining of one or more data types, the frequency of usage, and the one or more resources.

12. (Currently Amended) The method of claim 11, ~~wherein generation of the dynamic application characterization database~~ further comprising generating a dynamic application characterization database by:

reading, by the computing device, the static application characterization database;
collecting, by the computing device, runtime application data usage;
analyzing, by the computing device, the runtime application data usage and
identifying resource usage bottlenecks;
updating, by the computing device, the dynamic application characterization
database based on the analyzing.

13. (Cancelled)

14.-29. (Cancelled)

30. (Currently Amended) A system comprising:
a system of resources configured to execute and interact with an application;
a processor; and
a ~~D~~ynamic Application ~~O~~ptimizer, operated by the processor, and configured
to attempt to dynamically optimize ~~the~~ performance of the application, wherein
the dynamic application optimizer is configure to: [[:]]
analyze the configuration of the system of resources and processing
requirements of the application,
generate first one or more optimization action suggestions to potentially
improve performance of the application, based on a result of the analysis,
dynamically cause carrying out of the first one or more suggested
optimization actions,
predict performance of the application after carrying out of the suggested
optimization actions;
observe actual performance of the application after carrying out of the
suggested optimization actions;
compare the observed actual application performance to the predicted
application performance; and

utilize a result of the compare to generate second one or more optimization action suggestions to potentially further improve performance of the application.

a Device & Environment Database providing information to the Dynamic Application Optimizer about the system of resources; and
————— an Application Characterization Database providing information to the Dynamic Application Optimizer about the distributed application, wherein the Application Characterization Database includes:

a static application characterization database storing information regarding fixed characteristics of the application; and

a dynamic application characterization database storing information regarding mutable characteristics of the application, wherein the static application characterization database is included with the dynamic application characterization database.

31. (Currently Amended) The system of claim 30, wherein the Dynamic Application Optimizer is configured to:

determine ~~the~~ configuration of ~~a the~~ system of resources utilizing ~~the~~ Device & Environment Database having configuration information of the resources; and

determine the processing requirements of ~~the~~ application ~~running on the system of resources~~ utilizing ~~the~~ Application Characterization Database having processing requirement information of applications including the application[[:]].

~~analyze the determined configuration and requirements in order to attempt to optimize the performance of the application;~~

————— ~~generate optimization suggestions from the analysis; and~~

————— ~~dynamically causing applying of the optimization suggestions.~~

32. (Cancelled)

33. (Currently Amended) The system of claim 30-32, wherein the Dynamic Application Optimizer is configured to dynamically cause applying carrying out of the suggested optimization actions suggestions by:

dynamically causing allocating of additional portions of the system of resources to the execution of and interaction with the application; and

dynamically causing utilizing one or more acceleration tools;

wherein the one or more acceleration tools are selected from a group including:

primitive performance libraries;

managed runtime optimization settings; and

reordering portions of the application execution.

34. (Currently Amended) The system of claim 30-32, ~~wherein the~~ further comprising a ~~Device & Environment Database~~ that includes:

a device portion having information regarding ~~the~~ one or more types of resources in the system of resources and information regarding ~~the~~ one or more physical capabilities of ~~these~~ one or more resources of the system of resources; and

an environment portion having information regarding the configuration of the system of the resources, ~~substantially~~ current status, and ~~substantially~~ current capacity of the one or more resources within the system of resources.

35. (Currently Amended) The system of claim 34-32, wherein the Device & Environment Database is generated by:

collecting data from sensors coupled with the resources;

analyzing the data collected;

inferring an execution context characterization;

estimating ~~the~~ capacity of each resource; and

updating the device and environment characterization database.

36. (Cancelled)

37. (Currently Amended) The system of claim ~~35~~ 30, ~~wherein the~~ further comprising a static application characterization database that is generated by:

determining, at the application's compile time, ~~the~~ one or more data types utilized by the application;

determining, at the application's compile time, the frequency of the usage of the one or more data types;

determining, at the application's compile time, the one or more resources required by the application; and

updating the static application characterization database ~~with~~ based on the determined information ~~determining of the one or more data types, the frequency of usage, and the one or more resources.~~

38. (Currently Amended) The system of claim 37, wherein the dynamic application characterization database is generated by:

reading the static application characterization database;

collecting runtime application data usage;

analyzing the runtime application data usage and identifying resource usage bottlenecks;

updating the dynamic application characterization database based on said analyzing.

39. (Original) The system of claim 37, wherein the system of resources includes a plurality of hardware architectures; and

the application is a distributed application.

40. (Original) The system of claim 39, wherein the system of resources includes the Dynamic Application Optimizer.

41. (Currently Amended) An article comprising:

a tangible, non-transitory computer readable storage media; and

a plurality of instructions stored on the tangible, non-transitory computer readable storage media and, configured to enable a machine, in response to execution of the instructions, to perform operations including:

determining a configuration of a system of resources;

determining processing requirements of an application running on the system of resources ~~utilizing an application characterization database;~~
analyzing the ~~determined~~ configuration of the system of resources and the processing requirements of the application in order to attempt to optimize the performance of the application;
generating first one or more optimization action suggestions to potentially improve performance of the application, from based on a result of the analysis; and
dynamically causing ~~applying~~ carrying out of the one or more suggested optimization actions suggestions;
predicting performance of the application after carrying out of the one or more suggested optimization actions;
observing actual performance of the application after carrying out of the one or more suggested optimization actions;
comparing, by the computing device, the actual performance of the application to the predicted performance of the application;
utilizing a result of the comparing to generate second one or more optimization action suggestions to potentially further improve performance of the application,
~~wherein the application characterization database includes:~~
~~a static application characterization database storing information regarding fixed characteristics of the application; and~~
~~a dynamic application characterization database storing information regarding mutable characteristics of the application, wherein the static application characterization database is included with the dynamic application characterization database.~~

42. (Currently Amended) The article of claim 41, wherein the dynamically causing ~~applying~~ carrying out of the one or more suggested optimization actions suggestions includes:
dynamically causing allocating of additional resources to ~~the execution of and interaction with the application; and~~
dynamically causing utilizing of one or more acceleration tools.

43.(Currently Amended) The article of claim 42, wherein the dynamically causing utilizing of the one or more acceleration tools comprises utilizing one or more tools selected from a group including:

primitive performance libraries;
managed runtime optimization settings; and
reordering portions of application execution.

44. (Currently Amended) The article of claim 41, wherein the determining a configuration of a system of resources includes utilizing a device database and an environment characterization database.

45. (Currently Amended) The article of claim 44, wherein the device database includes information regarding ~~the~~one or more types of resources in the system of resources and information regarding ~~the~~one or more physical capabilities of ~~these~~one or more resources in the system of resources.

46. (Currently Amended) The article of claim 45, wherein the environment database includes information regarding the configuration of the system of the resources, ~~substantially~~ current status, and ~~substantially~~ current capacity of the one or more resources within the system of resources.

47. (Currently Amended) The article of claim 46, wherein ~~the instructions are further configured to enable the machine to perform operations~~ further include incrementally generating the device database and the environment characterization database as each of the one or more resources of the system of resources is powered-on.

48. (Currently Amended) The article of claim 44, wherein the ~~instructions are further configured to enable the machine to perform operations~~ further include dynamically generating the device and environment characterization database utilizing a service including instructions providing for:

collecting data from sensors coupled with ~~the one or more resources of the system~~
of resources;

analyzing the data collected;

inferring an execution context characterization;

estimating ~~the a~~ capacity of each of the one or more resources of the system of
resources; and

updating the device database and the environment characterization database.

49.-50. (Cancelled)

51. (Currently Amended) The article of claim 41, wherein the ~~instructions are further~~
~~configured to enable the machine to perform operations further include~~ generating ~~the a~~ static
application characterization database by:

determining, at the application's compile time, ~~the one or more~~ data types utilized by the
application;

determining, at the application's compile time, ~~the a~~ frequency of the usage of the one or
more data types;

determining, at the application's compile time, the one or more resources required by the
application; and

updating the static application characterization database ~~with~~ based on the determining of
the one or more data types, the frequency of usage, and the one or more resources required
information.

52. (Currently Amended) The article of claim 51, wherein the ~~instructions are further~~
~~configured to enable the machine to perform operations further include~~ generating ~~the a~~ dynamic
application characterization database by:

reading the static application characterization database;

collecting runtime application data usage;

analyzing the runtime application data usage and identifying resource usage
bottlenecks;

updating the dynamic application characterization database.

53. - 67. (Cancelled)